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ORNL

FOREIGN TRIP REPORT

TA

DATE: May 24, 2018
SUBJECT: Trip Report
TO: Angela Chambers, Nuclear Criticality Safety Program Manager, National Nuclear Security Administration / NA-511/GTN, Pantex Plant, PO Box 30020, Amarillo, TX 79120-0020

FROM: Marco T. Pigni

MEETING: TITLE Consultants' Meeting of INDEN - International Nuclear Data Evaluation Network I - on the Resonance Parameter Evaluation of the Fissile Actinides

MEETING: LOCATION International Atomic Energy Agency, Vienna

MEETING: DATES 8--11 May 2018,

ATTENDEES: ON BEHALF OF NCSP Marco T. Pigni

MEETING: BENEFIT TO NCSP

MEETING PURPOSE: The purpose of the Consultants' meeting was to discuss the validity and scope of the use of integral data in the process of the assembly of evaluated nuclear reaction data file.

Reactivity prediction of critical thermal assemblies, particularly solution systems, is strongly affected by the PFNS, by nubar energy dependence, and by the detailed shape of the cross sections below 10 eV. Newly evaluated PFNS for thermal-neutron induced fission of ^{235}U, ^{239}Pu and ^{233}U (within the Neutron Standards Project) resulted in lower PFNS average energy by about 30 keV. It is well established that a softer PFNS significantly increases the reactivity of the high-leakage solution benchmarks by 0.7--1.2 percent. The Thermal Neutron Constants from the new Standards-2017 also strongly affect the reactivity of thermal systems.

In the recent CIELO evaluation for ^{235}U the performance of the evaluated data has been preserved by a careful analysis of the measured capture-to-fission ratios at the lower end of the resolved resonance region to determine the resonance parameters of the first few resonances combined with the introduction of resonance nubar. The same has not been done for ^{233}U and ^{239}Pu (although resonance nubar is already used in ^{239}Pu evaluation). Also, the parameters of the resonances at energies above ~100 eV need a closer investigation.

SITES VISITED: International Atomic Energy Agency

ABSTRACT: See attached documents (INDEN report and presentation)

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REPORT OF FOREIGN TRAVEL

Consultants' Meeting of INDEN - International Nuclear Data Evaluation Network I - on the Resonance Parameter Evaluation of the Fissile Actinides

International Atomic Energy Agency, Vienna
8—11 May 2018

PURPOSE OF TRAVEL
The main purpose was

1. To review the current status of the resonance parameter evaluations of the fissile actinides
2. To check the impact of the new Standards-2017 and the softer PFNS of the fissile actinides on the criticality of thermal systems
3. To define strategies to use new PFNS combined with new RP evaluations for ^{233}U and ^{239}Pu
4. To co-ordinate the activities in different laboratories with the final goal of obtaining consistent evaluated data files that respect the differential data (particularly the thermal constants of Standards-2017, softer PFNS and new cross section measurements) and preserve good performance in criticality benchmarks, especially regarding the trends as a function of the above-thermal leakage fraction (ATLF)

Persons Contacted at the International Atomic Energy Agency

1. D. Cano-Ott (CIEMAT, Spain)
2. Y. Danon (RPI, USA)
3. S. Kunieda (JAEA, Japan)
4. G. Noguere (CEA, France)
5. P. Schillebeeckx (IRMM, Belgium)
6. L. Leal (IRSN, France)
7. A. Trkov (IAEA, Austria)
8. P. Dimitriou (IAEA, Austria)
9. R. Capote (IAEA, Austria)
10. A. Koning (IAEA, Austria)

Itinerary

05/06/18 – 05/07/18	Travel from Knoxville, USA to Vienna, Austria
05/08/18 – 05/11/18	Vienna, Austria (meeting agenda attached)
05/15/18	Travel from Milan, Italy to Knoxville, USA

DISTRIBUTION

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